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Cooper et al.

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[54] **RADIO TELEPHONE SYSTEM**

[75] Inventors: **Martin Cooper**, Glencoe; **Richard W. Dronsuth**, Westchester; **Albert J. Mikulski**, Chicago; **Charles N. Lynk, Jr.**, Arlington Heights; **James J. Mikulski**, Deerfield; **John F. Mitchell**, Elmhurst; **Roy A. Richardson**, Skokie; **John H. Sangster**, Hoffman Estates, all of Ill.

[73] Assignee: **Motorola, Inc.**, Chicago, Ill.

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[58] **Field of Search** ..... 179/41 A; 325/16, 55, 64

[56] **References Cited**

UNITED STATES PATENTS

3,517,315	6/1970	Malm	179/41 A
3,586,978	6/1971	Van Gorder	179/41 A
3,663,762	5/1972	Joel, Jr.	179/41 A
3,745,462	7/1973	Trimble	325/55

Primary Examiner—Kathleen H. Claffy
Assistant Examiner—Gerald L. Brigance
Attorney, Agent, or Firm—Eugene A. Parsons; James W. Gillman

[57] **ABSTRACT**

A portable duplex radio telephone system includes at least one base station transmitter having a predetermined base transmission range, and a plurality of portable or mobile units each having a predetermined portable maximum transmission range predeterminately shorter than the base transmission range. Satellite receivers are deployed about the base station within the base station transmission range for receiving transmissions from the portable units. The base station transmitter transmits signals on a signalling channel and on at least one communications channel. Each transmitter signalling and communications channel has a frequency that is paired or associated with a receiving frequency of the satellite receivers. In a multiple base station system, the portable receiver has means for scanning the base station transmitter signalling frequencies and for tuning the portable transmitter to the signalling frequency associated with the frequency of the strongest signalling signal received from the base transmitter. When communication is initiated, the portable transmitter and receiver are automatically retuned to one of the communications channels as determined by the strongest signalling frequency received by the portable receiver and by channel availability. Means are also provided in the system to continuously locate a portable unit and switch the operating frequency thereof as the portable unit moves between base station transmitter coverage areas. Further means are provided to automatically reduce the output power of each portable transmitter to the minimum level required for satisfactory communications in order to reduce battery drain and the interference caused by the portable transmitters.

31 Claims, 10 Drawing Figures